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ACREAGE FORMERLY CROPPED  
IN THE GREAT PLAINS

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H. Thomas Frey

Natural Resource Economics Division  
Economics Research Service  
U.S. Department of Agriculture  
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# ACREAGE FORMERLY CROPPED IN THE GREAT PLAINS

By H. Thomas Frey; Natural Resource Economics Division; Economics Research Service; U.S. Department of Agriculture; Washington, D.C. 20250; April 1983, ERS Staff Report No. AGES830404.

## ABSTRACT

Acreages of cropland harvested as reported by the periodic Censuses of Agriculture peaked in 60 percent of the counties in the Great Plains by 1929 and in 90 percent by 1954. When measured in terms of the difference between the sum of county peak acreages harvested since 1880 and the acreage harvested in 1978, a minimum of 42 million acres that were formerly used for crops were not so used in 1978. Examination of this acreage confirms the notion that only a small proportion is both suitable and readily available for expanding planted acreage.

## Key Words

Cropland, harvested cropland, former cropland, potential cropland, Great Plains.

\*\*\*\*\*  
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## Summary and Conclusions

Historically, a much larger acreage of cropland has been harvested in the Great Plains than at present. At least 42 million acres that were cropped at some time in the past were not cropped in 1978. This total represents the difference between the sum of county peak acreages harvested during 1880-1978 and the acreage harvested in 1978.

Acreages of harvested cropland peaked in a few of the 553 counties in the Great Plains as early as 1899. The most active periods for peak acreages were 1919-29 and 1944-54. In contrast, harvested acreages peaked in only 1 county during the 1930's and 13 counties during 1959-69. The 1970's was a period of resurgence as nearly 10 percent of the counties experienced maximum harvested acreages and, had Federal acreage control programs not been in effect, the total likely would have been higher.

Although the acreage formerly cropped in the Great Plains is large, only a limited acreage appears to be both suitable and available for crops. All but, perhaps, 15-20 million acres can be accounted for by acreage diversion in 1978, an increase in the acreage of cultivated summer fallow over time, and urbanization. The acreage diverted from production in 1978 had returned to production by 1981.

In general, the acreage not accounted for by diversion programs, summer fallowing, and urbanization is now used for pasture. Part of this acreage likely will not return to crop use; part, like the former cotton land of east Texas, could return if a suitable crop is found; and part likely would return if the production of small grains appears profitable.

Although the analysis reported herein is interesting, it does not provide a measure of the potential for expanding crop acreage in the Great Plains. At most, it (1) confirms the general impression or knowledge that the readily available acreage is limited and (2) provides some additional insight into the characteristics and distribution of marginal cropland in the region.





Acreage Formerly Cropped in the Great Plains  
by  
H. Thomas Frey

Introduction

The Natural Resource Economics Division, Economic Research Service is conducting a comprehensive assessment of agricultural resources in the Great Plains. As an aid in that assessment, this paper examines historical and recent harvested acreage data for the region. Specifically, it provides a measure of the acreage formerly cropped and general indications of the availability of this land for return to crop use.

The harvested acreage data are Census of Agriculture data for the 1880-1978 period. For each county, both the peak harvested acreage and the 1978 harvested acreage were recorded and the difference obtained. For purposes of this study, the difference between the peak and 1978 harvested acreages is defined as "acreage formerly cropped" or "former cropland". The year in which the harvested acreage peaked also was recorded as an aid in analysis.

The measure of land formerly cropped obtained in this manner is not precise, of course. Among the data limitations, acreages reported as cropland harvested in 1919 and earlier census included some duplication due to double cropping. Crop failure, poor weather conditions at planting time, inaccurate census measurements, government acreage control programs, and other factors also have affected data comparability.

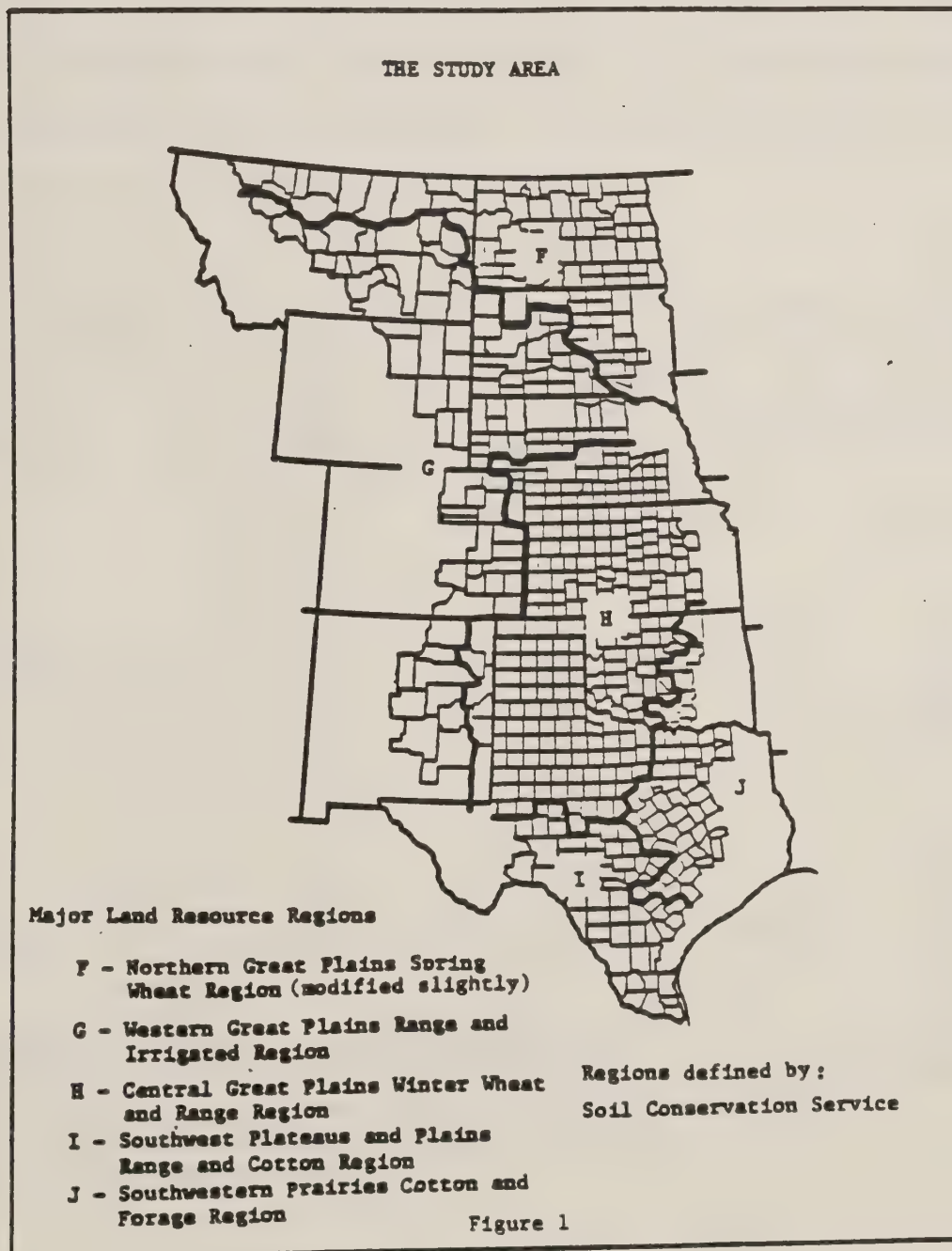
The Study Area

The Great Plains as defined in this paper includes Major Land Resource Regions (LRR's) F, G, H, I, and J as defined by the Soil Conservation Service (SCS) except for a slight modification in region F (figure 1). These five regions include 553 counties in 10 States extending from Canada to Mexico. A total of 448 million acres or one-fifth of the Nations' land area is included.





An LRR as defined by SCS consists of geographically associated Major Land Resource Areas (LRAs) which in turn consist of geographically associated land resource units that are characterized by particular patterns of soil, climate, water resources, land use, and type of farming (3). In grouping land resource units into LRAs and LRRs, the objective is to preserve as much information as







possible in relationships significant to agriculture. Uniformity is greatest in land resource units, considerably less in LRAs, and very much less in LRRs. Together, LRRs F, G, H, I, and J include 48 LRAs but these are not separately identified herein.

#### Acreage Formerly Cropped

Historically, a much larger acreage of cropland has been harvested in the Great Plains than at present. At least 42 million acres that were formerly cropped were not harvested in 1978 (table 1 and figure 2). This acreage has temporarily or permanently shifted to other land use categories including fallow and idle cropland, pasture land and, possibly, forest land.

Table 1. Cropland harvested, peak and 1978, by State, Great Plains 1/

State <u>2/</u>	Peak Acreage <u>3/</u>	1978 Acreage	Difference	
			Acreage	Percent <u>4/</u>
	- - - - - Million Acres - - - - Percent -			
North Dakota	22.6	19.0	3.6	16
South Dakota	12.2	8.6	3.6	30
Nebraska	14.9	10.5	4.4	30
Kansas	21.2	15.0	6.2	29
Oklahoma	13.4	7.3	6.1	46
Texas	31.9	17.2	14.7	45
Montana	7.9	7.3	.6	7
Wyoming	1.2	.9	.3	29
Colorado	5.4	4.3	1.1	20
New Mexico	1.8	.9	.9	52
Total	132.5	91.0	41.5	31

1/ Land Resource Regions F (modified slightly), G, H, I, and J as defined by the Soil Conservation Service (3) and outlined in figure 1.

2/ Parts of States except North Dakota as outlined in figure 1.

3/ Sum of county peak harvested acreages from 1880 to 1978.

4/ Calculated from unrounded data.

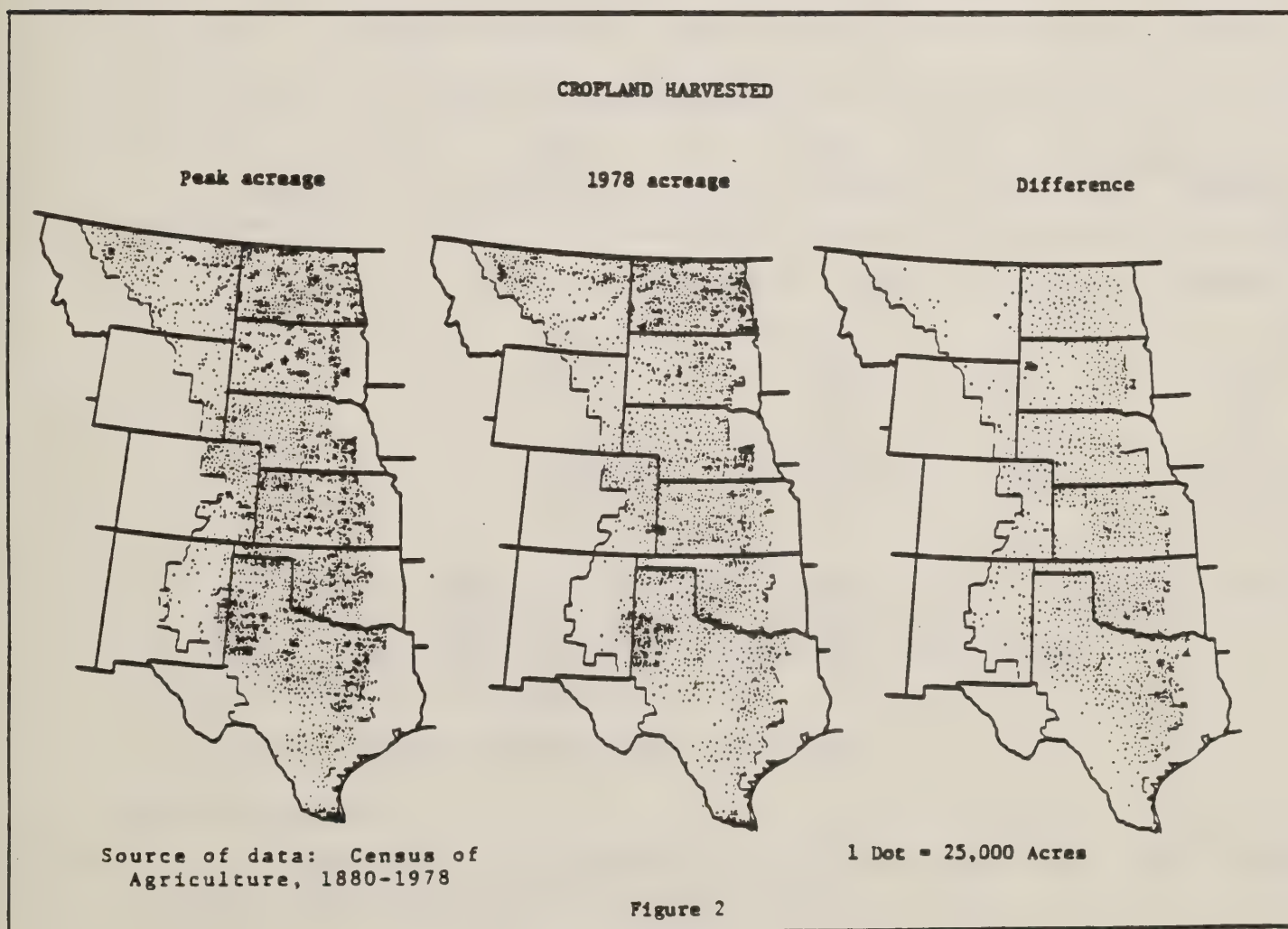
Source: Census of Agriculture, 1880-1978



More than 14 million acres or one-third of the acreage formerly cropped is in Texas. An additional 12 million acres or 30 percent is distributed equally between Kansas and Oklahoma and a similiar amount is divided about equally among the two Dakotas and Nebraska.

The acreage formerly cropped in Texas exceeds the 1978 harvested acreage in all States in the study area except North Dakota, Kansas, and Texas itself. Texas, which once easily led all of the Plains States in harvested acreage, ranked second to North Dakota in 1978.

Nineteen million acres, or 45 percent, of the acreage formerly cropped is in region H (table 2). This region contains 32 percent of all land in the study area including parts of Nebraska, Kansas, Oklahoma, Texas, Colorado, and New Mexico. An additional 9.6 million acres are in region J, located mainly in east







Texas. Peak acreages of harvested cropland were much larger than 1978 acreages in other regions as well.

#### Peaks Acreages by Time Periods

Acreages of cropland harvested have been peaking in Great Plains counties since 1899 (table 3) 1/. The most active period was 1919-29 when maximum acreages of cropland harvested were reported for 299 of the 553 counties. Another active period was 1944-54 when acreages peaked in 154 counties. These periods are associated with acreage build ups during and after World Wars I and II. In contrast, acreages peaked in only one county in the 1930's, a period characterized by both extreme economic depression and drought, and 13 counties during 1959-69 when major production control programs were in effect. The 1970's was a period of resurgence

Table 2. Cropland harvested, peak and 1978, by region, Great Plains 1/

Region <u>1</u> /	Peak Acreage <u>2</u> /	1978 Acreage	Difference	
			Acreage	Percent
	- - - - - Million Acres - - - - -			
F	35.1	29.1	6.0	16
G	18.8	13.5	5.3	28
H	60.1	41.1	19.0	32
I	4.2	2.6	1.6	38
J	14.3	4.7	9.6	67
Total	132.5	91.0	41.5	31

1/ Land Resource Regions F (modified slightly), G, H, I, and J as defined by the Soil Conservation Service (3) and outlined in figure 1.

2/ Sum of county peak harvested acreages from 1880 to 1978.

3/ Calculated from unrounded data.

Source: Census of Agriculture, 1880-1978.

1/ Cropland data reported in the 1900 Census of Agriculture and other Censuses prior to 1954, apply to the preceeding year.





as 48 counties experienced maximum harvested acreages and, had acreage control programs not been in effect, the total likely would have been higher. The time at which harvested acreages peaked provides some insight into the quality of former cropland.

Table 3. Distribution of counties, by time periods and regions, Great Plains 1/

Region <u>1/</u>	Number of counties with peak harvested acreages in:						
	1909 and earlier	1919 - 1929	1934 - 1939	1944 - 1954	1959 - 1969	1974 - 1978	Total
	----- Number -----						
F	1	35		36	4	13	89
G	2	53		36		13	104
H	22	127		72	6	12	239
I	2	29	1	10	3	10	55
J	11	55					66
Total	38	299	1	154	13	48	553

1/ Land Resource Regions F (modified slightly), G, H, I, and J as defined by the Soil Conservation Service ( 3 ) and outlined in figure 1.

Source: Census of Agriculture, 1880-1978.

1909 and earlier: Harvested acreages peaked in 38 counties involving 4.3 million acres of former cropland by 1909 (table 4). The majority of this acreage is distributed along the eastern margin of the study area in Kansas and Oklahoma and most of the remainder is in the Cross Timbers area of Oklahoma-Texas and the Claypan area of Texas (figure 3). These areas did not respond to the increase in demand for crop products in the 1970's. Livestock grazing is well established as the dominant land use. Given the early abandonment, present use, and other characteristics, former cropland in these counties is not likely to return to crop production.



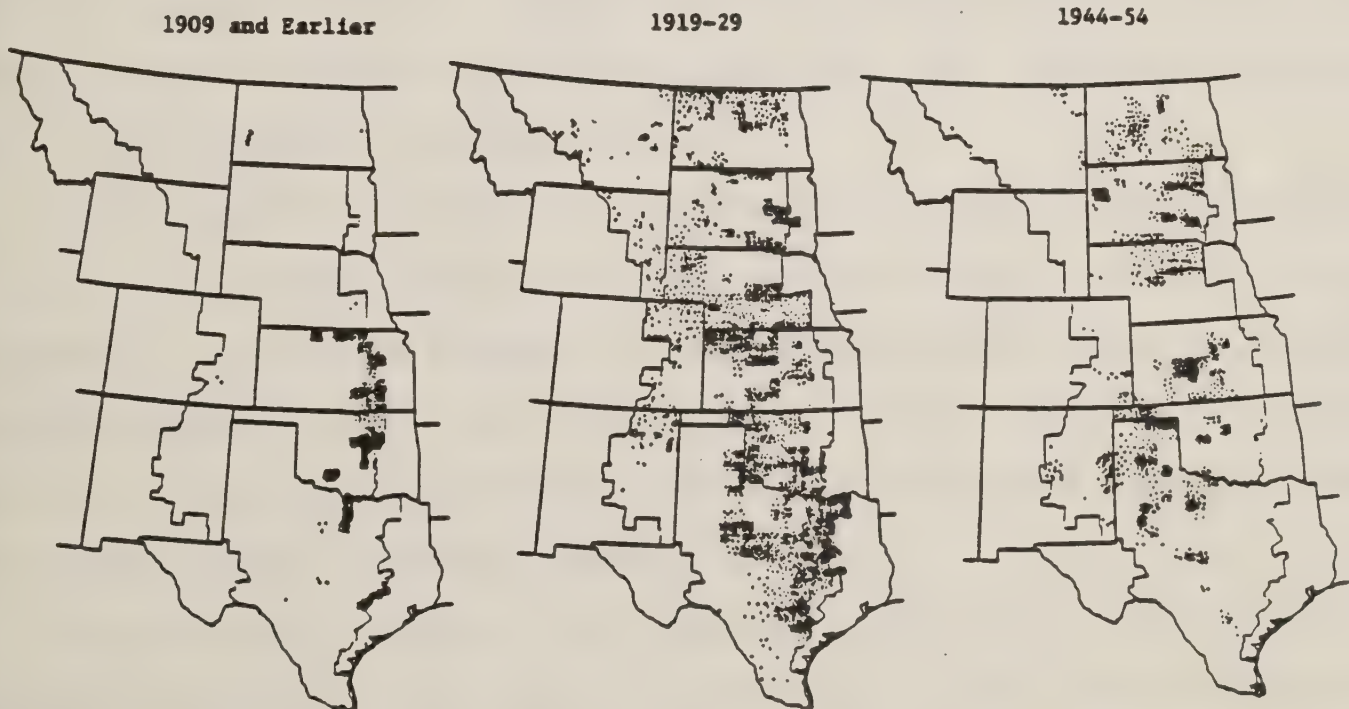
Table 4. Acreage formerly cropped, by time period, Great Plains 1/

Region <u>1/</u>	Difference between 1978 acreage and acreage peaking in:						
	1909 and earlier	1919 - 1929	1934 - 1939	1944 - 1954	1959 - 1969	1974 - 1978	Total
	----- Million Acres -----						
F	.1	2.9		2.6	.4		6.0
G	.1	2.9		2.2	.1		5.3
H	2.5	11.1		5.0	.4	.1	19.1
I	.1	1.1		.4			1.6
J	1.5	8.0					9.5
Total	4.3	26.0		10.2	.9	.1	41.5

1/ Land Resource Regions F (modified slightly), G, H, I, and J as defined by the Soil Conservation Service (3) and outlined in figure 1.

Source: Census of Agriculture, 1880-1978.

FORMER CROPLAND BY PERIOD OF PEAK ACREAGE



Source of data: Census of Agriculture, 1880-1978

1 Dot = 10,000 Acres

Figure 3





1919-29: Acreages harvested reached their peak in 54 percent of the counties in the study area during 1919-29. These counties contain 26 million acres or 63 percent of the acreage formerly cropped. Former cropland in counties that had peak acreages in 1919-29 is distributed in 18 of the 19 State parts of LRR's but concentrations are heaviest east of the irrigated centers of Texas and Oklahoma, in northwestern Kansas, southern Nebraska, and several scattered localities.

It is more difficult to generalize about acreages of former cropland in areas that peaked in 1919-29 than in 1909 and earlier years. Both summer fallow and diverted acres are present in most areas and tend to mask the quantity and quality of former cropland now used for pasture (tables 5 and 6). Regions I and J are major exceptions. These two regions have 9 million acres of former cropland in counties that peaked in 1919-29. As discussed later, most of this land appears to be strongly committed to pasture use or is unattractive for crop use.

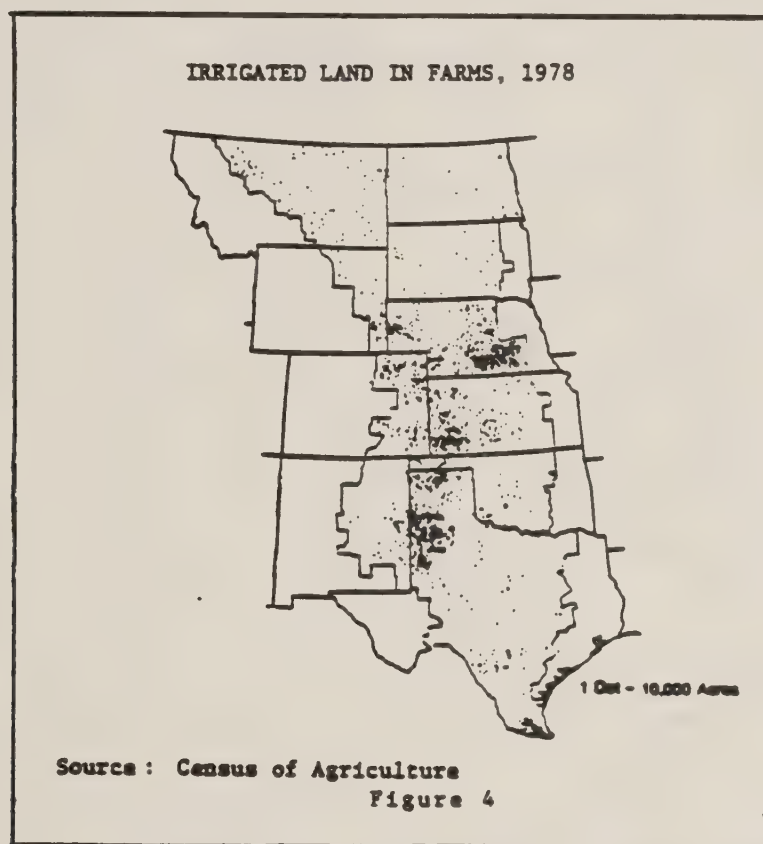
1944-54: About 10 million acres of former cropland are in counties that had maximum harvested acreages in 1944-54. During this period harvested acreages were at high levels, both nationally and in the Great Plains (2). This trend continued until the Soil Bank program was instituted in 1956.

Former cropland in counties that peaked in 1944-54 also is widely distributed. In general, this acreage appears alternately with the acreage in counties that peaked in 1919-29. In most areas acreages of former cropland reflect summer fallow and diverted acreages as well as possible abandonment or shifts to pasture. The Sand Hills area of Nebraska and nearby South Dakota, where fallow and diverted acreages are virtually absent, is a major exception.

In searching for reasons why these counties peaked at a later date than others, the main explanation in Texas, New Mexico, Oklahoma, Colorado, and Kansas appears to be the retarding effect of irrigation. Irrigation did not prevent a decline in



harvested acreage in these counties, but delayed the time and reduced the amount of change. This explanation is indicated by the irrigation pattern in figure 4. It may apply in Nebraska as well but not in the Dakotas.

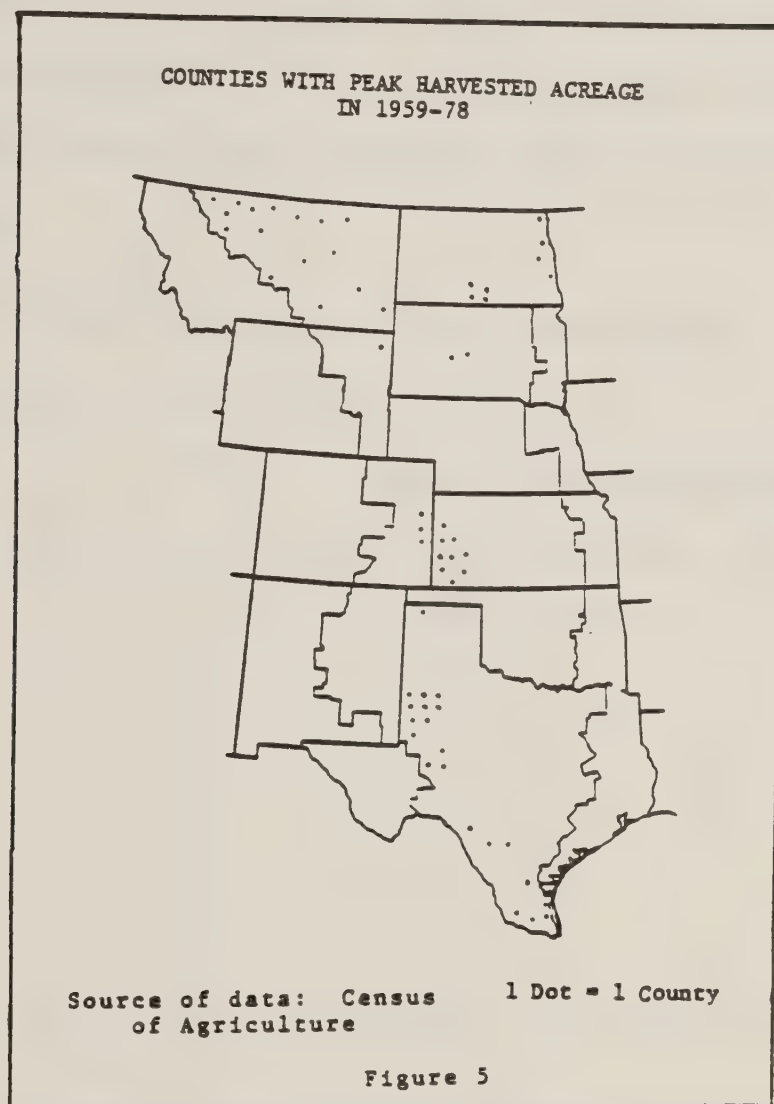


1959-78. Harvested acreages peaked in 61 counties during 1959-78 including 11 in 1959, 2 in the 1960s, 10 in 1974 and 38 in 1978. The total for 1978 probably would have been higher without acreage control programs. About half of the counties that peaked during 1959-78 were in irrigated areas of west Texas, south Texas, and western Kansas. Many of the remainder were associated with dry farming in Montana (figure 5).





The 23 counties that had maximum harvested acreages in 1959-74 had 1 million acres of former cropland. Those counties that peaked in 1978, of course, had no former cropland.



### Potential Acreage for Harvest

The 42 million acres formerly cropped equal 31 percent of the sum of county peak acreages harvested and 46 percent of the 1978 harvested acreage. How much of this land has potential for returning to planted or harvested crops? No detailed assessment is attempted here but several broad considerations are discussed below.



Set-aside acreage: In 1978, about 9.1 million acres were set aside or diverted from production in the Great Plains under Federal farm programs (table 5 and figure 6). Without incentives to limit acreage this land probably would have been harvested, thereby reducing the spread between peak and 1978 harvested acreage to about 32 million acres. In fact, controls were subsequently removed and by 1981 harvested acreage in the regions apparently had increased by somewhat more than the acreage diverted in 1978 (4).

Table 5. Set-aside acreage, by State, Great Plains, 1978 1/

State <u>2/</u>	Total	Land Resource Region 2/				
		F	G	H	I	J
	----- Million Acres -----					
North Dakota	1.8	1.8				
South Dakota	.7	.5	.2			
Nebraska	.9		.1	.8		
Kansas	2.0			2.0		
Oklahoma	.9			.9		
Texas	1.4			1.1	.1	.2
Montana	.7	.5	.2			
Wyoming	.1		.1			
Colorado	.5		.4	.1		
New Mexico	.1			.1		
Total	9.1	2.8	1.0	5.0	.1	.2

1/ Land set aside from crop production in the Federal farm programs in 1978.

2/ States or State parts of regions outlined in figure 1.

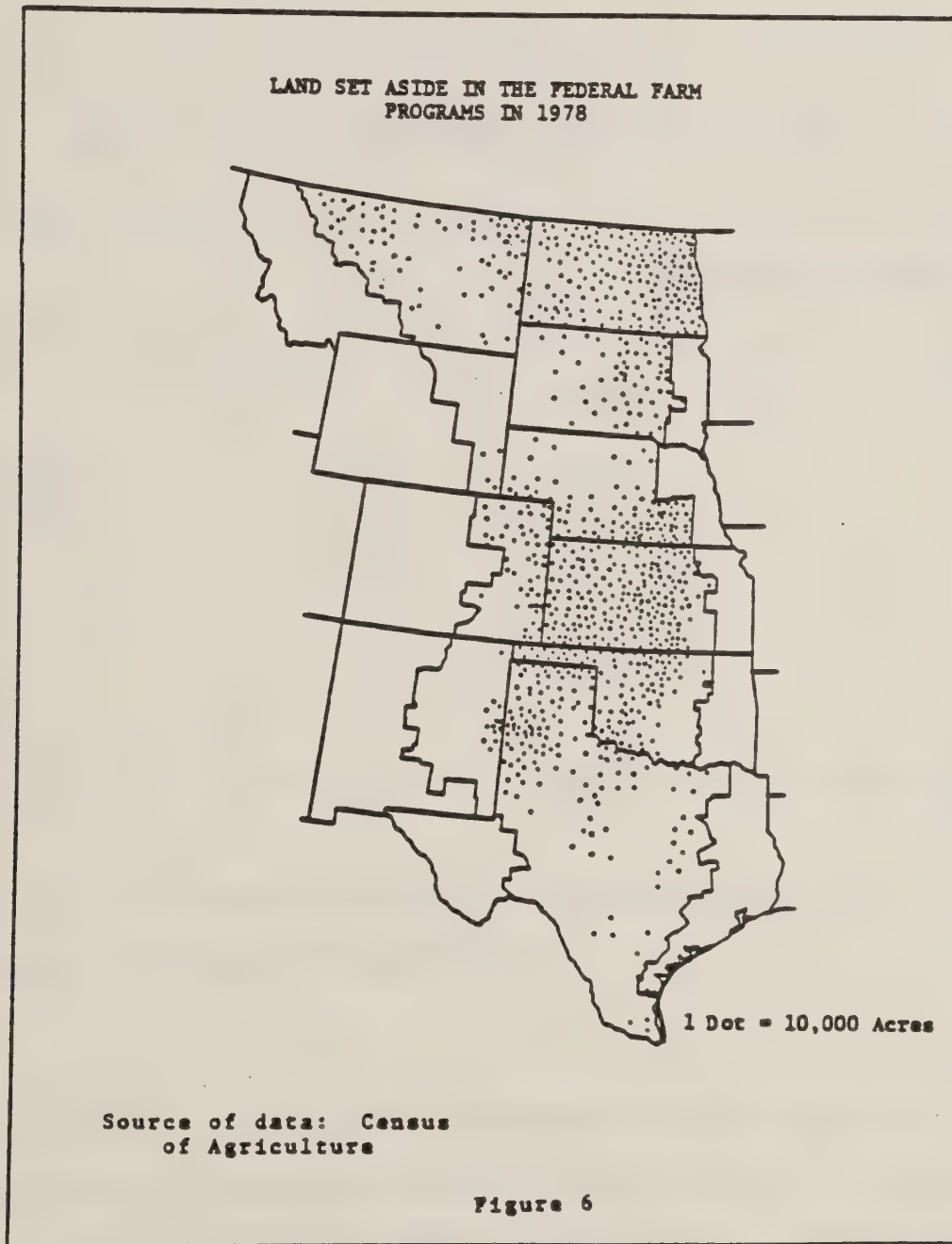
Source: 1978 Census of Agriculture.

Cultivated summer fallow: In the dryer portions of the West, land is cultivated for a season or more to control weeds and conserve or accumulate moisture before small grains are planted. This practice is necessary in some areas and optional in others. About 26 million acres were summer fallowed in the Great Plains in 1978 (table 6 and





figure 7). Nationally, the fallowed acreage tripled from 10 million acres in 1929 to 31 million acres in 1978 with most of the increase occurring in the Great plains, particularly regions F, G, and H (2). A direct measure is not possible but much of the additional summer fallow apparently shifted from harvested cropland. Since



fallowing is a necessary or yield-increasing practice, little of the present acreage is likely to return to crop use (except in rotation with an equivalent



acreage). Thus, to obtain an indication of potential harvested acreage the original 42 million acres formerly cropped should be further reduced by the large but undetermined acreage that shifted from harvested to summer fallowed land.

Table 6. Cultivated summer fallow, Great Plains, 1978

State <u>1/</u>	Total	Land Resource Region 1/				
		F	G	H	I	J
	----- Million Acres -----					
North Dakota	6.5	6.5				
South Dakota	1.2	.5	.7			
Nebraska	2.1		.6	1.5		
Kansas	5.6			5.6		
Oklahoma	.6			.6		
Texas	1.6			1.4	.1	.1
Montana	5.2	3.6	1.6			
Wyoming	.4		.4			
Colorado	2.5	*	2.1	.4		
New Mexico	.1			.1		
Total	25.8	10.6	5.4	9.6	.1	.1

1/ States or State parts of regions outlined in figure 1.

Source: 1978 Census of Agriculture.

Urbanization: Urbanization is always a consideration when agricultural land losses are involved. Fifty seven counties or 10 percent of the counties in the Great Plains are in Standard Metropolitan Statistical Areas (SMSAs) (table 7 and figure 8). Despite this large number neither the Great Plains nor the majority of SMSA counties are highly urbanized. Although associated with concentrations of urban population, only 23 of the 57 counties had 100,000 or





CULTIVATED SUMMER FALLOW, 1978

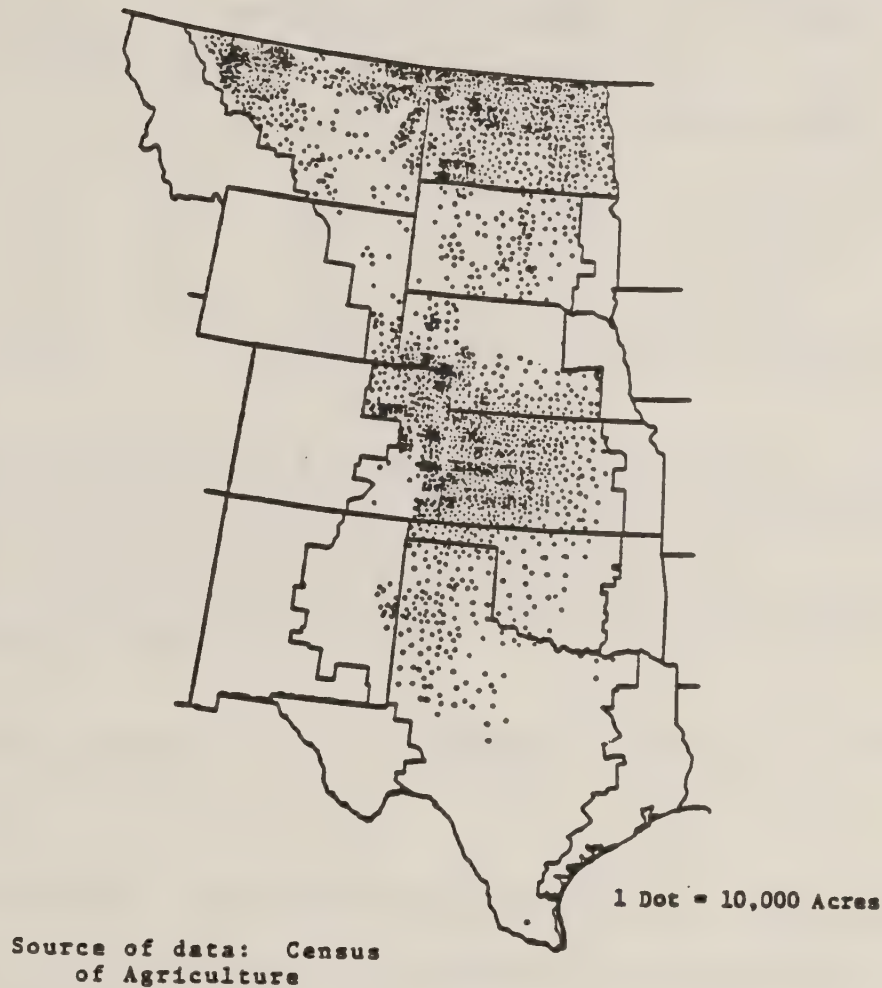


Figure 7

more inhabitants in 1980 and only four had populations in excess of 500,000. At the other extreme, five of the SMSA counties had fewer than 20,000 inhabitants (6).

The 57 SMSA counties contain 6.7 million acres of former cropland. This total represents a decline of 43 percent in harvested acreage compared with 31 percent for all counties. More than half of the former cropland in SMSA



Table 7. Harvested acreage, peak and 1978, by SMSA counties, Great Plains 1/

Regions <u>1/</u>	SMSA Counties <u>2/</u>	Peak Acreage <u>3/</u>	1978 Acreage	Change	
				Acreage	Percent 4/
	Number	- - - - - Million Acres - - - - -			Percent
F	4	2.4	2.2	.2	8
G	6	1.7	1.4	.3	20
H	18	4.4	2.4	2.0	45
I	6	1.2	.9	.3	30
J	23	6.0	2.1	3.9	65
Total	57	15.7	9.0	6.7	43

1/ Land Resource Regions F (modified slightly), G, H, I, and J as defined by the Soil Conservation Service (3) and outlined in figure 1.

2/ Number of counties in Standard Metropolitan Statistical Areas as classified in the 1980 Census of Population.

3/ Sum of country peak harvested acreages from 1880 to 1978.

4/ Calculated from unrounded data.

Source: Acreage data from the Census of Agriculture, 1880-1978.

counties is in region J where cropland abandonment has been high for various reasons. Most of the remainder is in region H, the only region where the proportional decrease in cropland harvested in SMSA counties exceeded the proportional decrease in all counties. Interestingly, three SMSA counties-Cass and Grand Forks counties, North Dakota and Hidalgo county, Texas had peak harvested acreages in 1978.

It is clear that only a minority of the 6.7 million acres of former cropland in SMSA counties has been urbanized. The Dallas-Ft. Worth SMSA provides a major example (table 8). It has 19 percent of the SMSA counties and, 28 percent of the former cropland in SMSA counties. In 1980 the urban area in the Dallas-Ft. Worth SMSA counties totaled 1.0 million acres, or the equivalent of 53 percent of the acreage formerly cropped in the SMSA. The peak harvested acreage for the SMSA





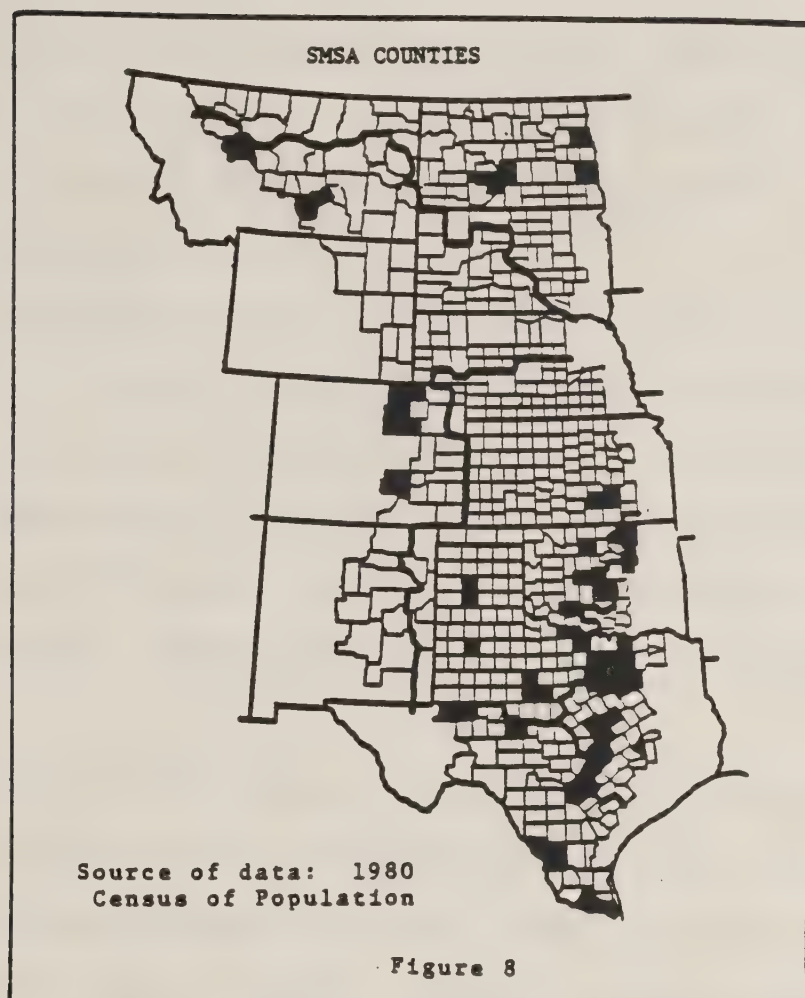


Table 8. Characteristics of SMSA Counties, Great Plains

SMSA Counties	Counties	Total land area	Urban area	Harvested acreage		
				Peak	1978	Difference
	<u>Number</u>	----- Million acres -----				
Dallas-Ft. Worth	11	5.4	1.0	2.8	.9	1.9
Other	46	37.0	1.9	12.9	8.1	4.8
Total	57	42.4	2.9	15.7	9.0	6.7

Source: Census of Agriculture, 1880-1978.  
Census of Population, 1980.



totaled 52 percent of the land area, suggesting that a similar proportion of the 1.0 million urban acres represents former cropland. Overall, urban areas totaled 2.9 million acres in the 57 SMSA counties in 1980 and probably occupy a smaller acreage in nonmetropolitan counties.

Abandonment: Some land in the Great Plains that once was used for crops has, of course, shifted to pasture or other uses. Abandoned cropland often is not clearly identifiable in available statistics due to the complicating presence of cultivated summer fallow, land diverted from production under Federal farm programs, and other influences. Region J is a major exception. It has 9.6 million acres of former cropland, much of which is now clearly used for pasture.

The 9.6 million acres of former cropland in region J represents a decline of 67 percent or more than double the average for the entire study area (table 2). Neither cultivated summer fallow nor Federal acreage diversion programs are significant in region J (tables 5 and 6). It does have several major urban concentrations including Dallas, Fort Worth, and San Antonio but, as seen above, urbanization explains only a minority of the decline. The massive decrease largely represent<sup>s</sup> a shift from crops to pasture.

Two SCS reports that reflect data from the Census of Agriculture provide a summary of current land use and recent trends in region J ( 1 and 3). The latest of these indicates that native and improved pasture account for more than 80 percent of the land in four of the six LRAs in the region and about 50 percent of the remaining two LRAs. The earlier report indicates decidedly higher proportions of cropland and lower proportions of pasture in the early 1960's. Nationally, the acreage of cropland harvested in 1978 was four times larger than the acreage of cropland used only for pasture, another Census category; but in

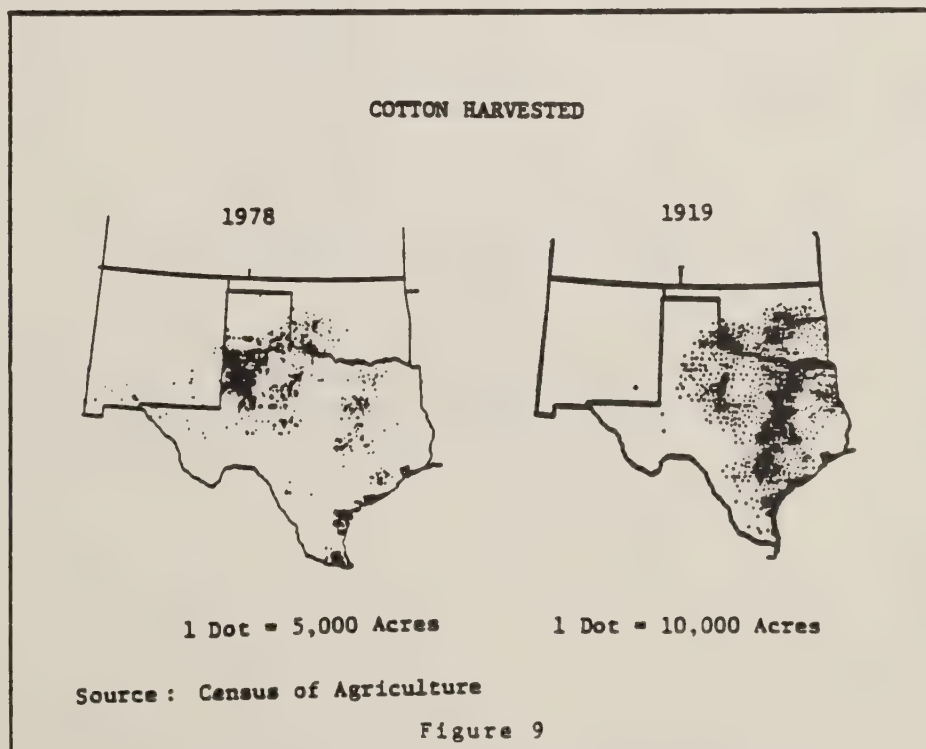




region J the two categories occurred in equal proportions. During 1949-78, cropland used only for pasture increased in 63 of 66 counties in region J for a collective increase of 2.6 million acres. Data for years prior to 1949 are not comparable but this trend probably has existed for a much longer period.

Most of the former cropland in the Great Plains that is not currently fallowed or idled by programs or in urban places probably is used for pasture. The total is not measurable but, perhaps, is roughly 15-20 million acres. A disproportionate share of this acreage is in region J but land in this category occurs in all regions.

Former cropland shifted to pasture for a variety of physical-economic reasons. Much, if not most of it, probably is not cropped because of low or irregular yields or unsuitability for a crop currently in demand. Such land might readily return to production if, for example, irrigated cotton in the West should lose its comparative advantage (figure 9).





Although former cropland now in pasture use often is not distinguishable, the acreage classified as cropland used only for pasture by the Census of Agriculture may provide a practical indication. By definition, cropland pasture is the most likely source of land for expanding the dryland acreage for harvest. In 1978, nearly 20 million acres in the Great Plains were so classified (table 9 and figure 10). This total represents an increase of 9 million acres since 1949, the first year for which generally comparable data are available.

Table 9. Cropland pasture, by State and region, Great Plains, 1978 1/

State <u>2/</u>	Total	Region 3/ Million acres				
		F	G	H	I	J
North Dakota	1.6	1.6				
South Dakota	1.5	1.0	.5			
Nebraska	1.4		.4	1.0		
Kansas	2.0			2.0		
Oklahoma	2.7			1.9		.8
Texas	8.8			2.6	1.9	4.3
Montana	.6	.2	.4			
Wyoming	.2		.2			
Colorado	.5		.4	.1		
New Mexico	.3		.1	.2		
Total	19.6	2.8	2.0	7.8	1.9	5.1

1/ Cropland used only for pasture in 1978.

2/ State or State parts and regions outlined in figure 1.

3/ Land Resource Regions outlined in Figure 1.





# CROPLAND PASTURE

1978

Increase 1949-78

Decrease 1949-78



Source of data: Census  
of Agriculture

1 Dot = 5,000 Acres

Figure 10

Focusing on region J again, the quality of former cropland is suggested by the mix of harvested crops in the Texas part in 1978:

	<u>Million Acres</u>
Hay	1.3
Sorghum	1.1
Cotton	.5
Wheat	.4
Oats	.2
Other	.5
Total	<hr/> 4.0



The majority of this acreage was in low-value or low-demand crops. Of the big-acreage crops nationally, wheat was of limited importance while corn and soybeans were of very minor importance. Most of the former cropland in this and other regions that is now used for pasture may be even less attractive for crops.

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